



**M-6007-Z331P  
Racing Crate Engine  
INSTRUCTION SHEET**

NO PART OF THIS DOCUMENT MAY BE REPRODUCED WITHOUT PRIOR AGREEMENT AND WRITTEN PERMISSION OF FORD RACING PERFORMANCE PARTS.

# **STOP!**

# **READ THIS!**

**THIS ENGINE REQUIRES  
RACING OIL THAT CONTAINS  
1200 PPM (parts per million)  
ZDDP (zinc-dialkyl-dithio-phosphate).**

**THIS ENGINE IS SHIPPED  
WITHOUT OIL!**

**Techline 1-800-367-3788**

Factory Ford shop manuals are available from Helm Publications, 1-800-782-4356



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Please contact the Techline for the most current instruction information 1-800-367-3788.

!!! PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY PRIOR TO INSTALLATION !!!

## OVERVIEW:

These instructions consist of five (5) sections:

- 1) Technical Specifications: M-6007-Z331P Racing Crate Engine
- 2) Lubrication Priming Procedure
- 3) Bill of Materials: Racing Crate Engine
- 4) Torque Specifications
- 5) Engineering Notes for M-6007-Z331P

## 1. TECHNICAL SPECIFICATIONS: M-6007-Z331P Racing Crate Engine

Crate Engine Part Number	M-6007-Z331P
Engine Type	302-Based Small Block
Displacement (cubic inches)	331
Block M-6010-BOSS302	Cast Iron; 4-Bolt Main (center 3)
Bore	4.125
Stroke	3.100
Crankshaft	Forged Steel (flywheel bolts require sealer)/0 balance
Vibration Damper (M-6316-C351)	Detachable weight removed for 0 balance
Connecting Rod (CRS5400C3D)	H-Beam Forged Steel (5.400 center to center .927 pin)
Piston (SBF245125D07)	Forged Aluminum
Camshaft	Mechanical Flat Tappet
Int./Ex. Lobe Centerlines	104° Int. Centerline/116° Ex. Centerline
Camshaft Duration	260° @ .050" lift (int. and ex.)
Camshaft Gross Lift	.610" (int. and ex.)
Cylinder Head (CM-6049-Z304PA)	Aluminum
Chamber Volume	59 cc
Valve Diameter Int./Ex.	2.080" Int./1.600 Ex.
Compression Ratio	11.8:1
Rocker Arm (M-6564-F351)	Aluminum Roller 1.65:1 Ratio Intake Offset .150"
Recommended Timing	32° BTDC total by 4000 rpm (110 octane racing fuel)
Maximum Rated rpm	7100 rpm
Oil Pan	7 quart plus filter/cooler
Oil Filter	M-6731-FL1A
Oil Pressure	50-70 psi @ 240° F/4000 rpm
Recommended Oil	<b>Must be RACING GRADE OIL with minimum of 1200 ppm ZDDP</b>
Max Oil Temperature	280° F
Coolant Temperature	195° F Thermostat
Spark Plugs	AGSF-22C
Firing Order	1-3-7-2-6-5-4-8
Fuel Pressure (@ carburetor)	6-7 psi
Fuel Type	104 octane (R+M/2) minimum

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IS-1850-0168



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### Recommended Parts Not Included

M-12259-M302	Universal Spark Plug Wire Set
or	
M-12259-M301	Pre-fit Black Spark Plug Wire Set
M-6375-D302	0- Balance Flywheel (may require M-6397-A302 metric bolt kit, dependent on clutch)
M-4216-A210	Flywheel Bolts (note threads have required sealer pre-applied)
Fel-Pro 1262R	Intake Manifold Gasket Set

### Standard Operating Specifications Nominal

Main Bearing Clearance	.0020" -.0025"
Rod Bearing Clearance	.0020" -.0025"
Crankshaft End Float	.005"-.008"
Wrist Pin to Rod Clearance	.0010"-.0012"
Wrist Pin to Piston Clearance	.0010"-.0012"
Piston to Deck Distance	.005" below deck
Piston to Bore Clearance	(follow piston mfg. recommendations)
Valve Spring Installed Height	1.900" (148#)
Intake Valve to Guide Clearance	.0014"-.0016"
Exhaust Valve to Guide Clearance	.0018"-.0022"
Valve Lash	.016 cold /.022 hot

### 2. LUBRICATION PRIMING PROCEDURE:

- STEP 1:** Fill engine with recommended oil.
- STEP 2:** Hand rotate engine to cylinder #1 TDC firing.
- STEP 3:** Remove distributor cap.
- STEP 4:** Mark rotor position on distributor housing.
- STEP 5:** Mark distributor housing and intake manifold interface.
- STEP 6:** Remove distributor.
- STEP 7:** Insert a ¼" deep-well 6-point socket and long extension into distributor hole and engage the oil pump drive shaft.
- STEP 8:** Remove valve covers.
- STEP 9:** Rotate counterclockwise with an electric drill until oil flow is visible in the rocker cover area.
- STEP 10:** Re-install valve covers.
- STEP 11:** Remove socket/extension from distributor hole.
- STEP 12:** Install distributor and align **both** rotor to distributor housing **and** distributor housing to intake manifold marks. Note: If distributor does not drop into place, gradually rotate engine over until distributor drops. **Do not** force distributor into position.
- STEP 13:** Install distributor hold-down.
- STEP 14:** Check oil level.
- STEP 15:** Set timing as recommended (total advance of 32° BTDC @ 4000 rpm).

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### 3. BILL OF MATERIALS: Racing Crate Engine

Assembly Part Number   # **M-6007-Z331P**  
Description               Bill of Materials Racing Crate Engine  
Date of Revision         06-MAY-2009

Part Number	Description
20-850	DIPSTICK AND TUBE
287239-S	MAIN STUD
35-336-4	CAMSHAFT
388192-S	TIMING COVER DOWEL
388813-S	BALANCER BOLT
42910-S	CAM PLATE BOLTS
T740805	PUSHRODS
833-16	LIFTERS
AGSP-22C	SPARK PLUG
C2OE-6A008-A2	HEAD DOWELS
C3AZ-6287-B	ECCENTRIC
CB663H	ROD BEARINGS
CM-6049-Z304PA	CYLINDER HEAD
M-6622-T302	OIL SCREEN
M-6675-T302	OIL PAN
CM-6731-FLA	OIL FILTER
M-8501-F351	WATER PUMP
CRS430231005400	CRANKSHAFT
CRS5400C3D	CONNECTING ROD SET
D8TZ-7600-A	PILOT BEARING
D9ZZ-7007-A	REAR COVER PLATE
E6DZ-6700-A	FRONT COVER SEAL
E7AZ-6A674-A	PAN RAIL (L)
E7AZ-6A674-B	PAN RAIL (R)
EAD-6397-B	TRANSMISSION DOWEL
F67E-6378-A	CRANK DAMPER WASHER
EOAZ-6626-B	OIL PUMP GASKET
F1SZ-6701-A	REAR MAIN SEAL
F1TZ-6023-A	TIMING POINTER
F2AE-6890-AA	OIL FILTER INSERT

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F3TE-6278-A	CAM GEAR WASHER
F3TZ-6020-A	FRONT COVER GASKET
F5TE-6710-CB	OIL PAN GASKET
M-6010-BOSS302	BLOCK
M-6051-R351	CYLINDER HEAD GASKET
M-6059-D351	FRONT COVER
M-6014-BOSS	HEAD STUD KIT
M-6261-J351	CAM BEARINGS
M-6268-A302	TIMING SET
M-6316-C351	CRANK DAMPER
M-6375-D302	FLYWHEEL
M-6564-F351	ROCKER ARM
M-6582-BOSSP	VALVE COVER SET BOSS
M-6600-D2	OIL PUMP
M-6605-A302	OIL PUMP SHAFT
MS 590 H	MAIN BEARING
P13264R	RUBBER VALVE COVER GASKET
PK-131	CRANK KEY
SBF245125D07	PISTON SET W/RINGS AND PINS

**NOTE: Piston Part #SBF245125D07 consists of the following parts:**

Component Part #	Component Description	Source
4130MS-15	RING SET	MAHLE
6436901	ROUND WIRE LOCK	MAHLE
6457808	PISTON PIN	MAHLE

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**NOTE: Cylinder Head CM-6049-Z304PA consists of the following parts:**

Part number	Description	Source
M-6049-Z304P	CNC PORTED HEAD	Ford Racing
M-6505-B304	EXHAUST VALVE	Ford Racing
27362	INTAKE VALVE	Ford Racing
953	VALVE SPRINGS	Comp Cams
741-1	VALVE SPRING RETAINERS	Comp Cams
614-1	VALVE STEM LOCKS	Comp Cams
42377-1	VALVE SPRING LOCATORS	Comp Cams
CM-6571-B221	VALVE STEM SEALS	Ford Racing
CM-6566-Z304D	PUSHROD GUIDE PLATES	Ford Racing
DRP154	ROCKER STUD	ARP

#### 4. TORQUE SPECIFICATIONS:

Application	Torque (lb-ft unless otherwise noted)	Recommended Lubricant
Main nuts 1/2 inch	95-105	Engine oil
Main splayed bolts 3/8 inch	35-45	Engine oil
Rod bolts	50	ARP Moly rod bolt lube
Head bolts	95-105	Engine oil
Rocker studs	60-65	Loctite PFT
Intake manifold bolts	18-20	Loctite 242
Flywheel bolts	75-80	Loctite 242 or dry-seal
Vibration damper bolt	90	Engine oil
Oil pump to block	28-35	Loctite 242
Oil pickup tube to main stud	28-35	Loctite 242
Cam bolt	40-45	Loctite 242
Cam retainer plate bolt	9-12	Loctite 242
Tappet guide retainer	9-12	Loctite 242
Oil pickup tube to oil pump	12-18	Loctite 242

#### 5. ENGINEERING NOTES FOR M-6007-Z331P:

All M-6007-Z331P engines will have mechanical flat tappet camshafts broken in, no additional break-in is required.

Each M-6007-Z331P comes with a dyno test sheet. Components used to produce the test runs are as follows:

Superflow air meter/bell

750 Demon carburetor

Parker Funnelweb intake manifold (port matched)

Dyno headers 1-3/4" O.D. x 26" long primary 3" collector

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